Exercise Week15

- How unlucky is this streamer?

Please refer to the follwing news:

不忍了｜丁特《天堂M》紫布風波　遊戲橘子開吉了

Loot Boxes refer to a pay-to-win mechanism that players are able to buy a lottery and win advanced game items with certain probability. A famous streamer in Taiwan paid millions of NTD to play the lottery for over 471 times and ultimately wins 11 advanced items. The game publisher claims that the winning probability should be 10% per se. That is, if you buy 471 lotteries, your expected value of advanced items should be around 47 (47.1 exactly).

Please fix the winning probability to 10% and use Monte Carlo to simulate that:

1. 10,000,000 rounds of simulation
2. 471 lotteries in each round
3. Based on 10,000,000 rounds of simulation, what is the probability of
    I. Winning <=40 advanced items
    II. Winning <=30 advanced items
    III. Winning <=20 advanced items
    IV. Winning <=11 advanced items (as the streamer)

Feel free to use your own format to output the results.

(10,000,000 times)

```
%%shell
g++ W15S.cpp -o W15S
./W15S
```

```
The estimated prob. of winning <= 40 items: 0.1408433
The estimated prob. of winning <= 30 items: 0.0028117
The estimated prob. of winning <= 20 items: 1.6e-06
The estimated prob. of being unlucky as the streamer (<=11 items): 0
```

(100,000,000 times)

```
%%shell
g++ W15S.cpp -o W15S
./W15S
```

```
The estimated prob. of winning <= 40 items: 0.14088444
The estimated prob. of winning <= 30 items: 0.00281725
The estimated prob. of winning <= 20 items: 1.79e-06
The estimated prob. of being unlucky as the streamer (<=11 items): 0
```

Please name your .ipynb file as YourID_Week15.ipynb and upload it to moodle system. (ex. H3700001_Week15.ipynb)